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Residual activity of α-chymotrypsin in water-1,--propanediol mixtures

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Abstract

© 2017 Nova Science Publishers, Inc. All rights reserved. A novel experimental method was proposed to study the stability of enzymes in water-organic mixtures. This method is based on the analysis of the residual enzyme activity. Advantages of our method: (I) The residual activity curves can be determined in the entire range of the water content in organic liquids. (II) Enzyme activity values are measured at fixed reaction conditions. (III) Information on the changes in the state of the catalytically active site can be obtained separately from the other contributions (for example, changes in the solvation of the reagents and products in various water - organic mixtures). To show the efficiency of the proposed method we studied the residual activity of bovine pancreatic α-chymotrypsin (CT) in water-1,2- propanediol mixtures in the entire range of water content at 25°C. The obtained results show that the degree of stabilization/ destabilization of α- chymotrypsin depends strongly on the water content in organic solvent. (1) At high water content, the residual activity values are higher than 100%. (2) At low water content, the residual catalytic activity is~90-95%, compared with that observed after incubation in pure water. (3) A minimum on the residual activity curve was observed at intermediate water content.

Keywords

1,2-propanediol (1,2-PG), Biocatalysis in water-organic mixtures, Bovine pancreatic α-chymotrypsin (CT), Organic solvent, Residual activity, Stability, Water

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